

# The Lime Middens of Cumberland Island

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A major problem confronting early colonists residing along the southeastern coast of North America was the development of a building material that could withstand the special challenges of the environment. The hot, humid climate rendered wood construction unsuitable because of its susceptibility to rot and insect infestation. Traditional forms of masonry involving the use of bricks, were equally unacceptable due in large measure to shortages of requisite raw materials and excessive cost.<sup>1</sup> Some happy medium had to be reached that would provide the 18th-century Europeans residents of the area with durable and affordable housing.

The answer for many was tabby, a building material comprised of lime, sand, and oyster shell. Tabby use in the New World has a long and storied history.<sup>2</sup> Brought to this hemisphere by the Spanish in the 16th century, it was adopted by British colonists in the early 18th century. It was particularly popular in the colony of Georgia, where its use was advocated by the colonies' founder General James Oglethorpe. Colonist Henry Myers noted: "As bricks were dear and much labor for young beginners, we have fallen upon a much cheaper and better way of making houses, of a mixture of lime and oyster shells (of which we have vast quantities) framed in boxes, which soon dries and makes a beautiful, strong and lasting wall."<sup>3</sup>

High quality lime was a critical component in tabby construction. Since lime in bagged form was not available in the 18th century, the only way to obtain lime was to produce it oneself. Therefore, the manufacture of lime was an essential component of masonry construction during this era, and it was particularly important where tabby was a popular building material.<sup>4</sup>

## *Lime Manufacture and Tabby*

Lime manufacture in southern coastal regions during the colonial era was extremely labor intensive. Initially a pit had to be excavated and filled with pine knots, heart pine, and other small sources of kindling. Once the pit was completed, a log structure, or rick, was erected over it. The rick consisted of several tiers of logs that supported layers of smaller logs covered with thick layers of oyster shells.<sup>5</sup> Outwardly, the rick resembles a small, roofless, log cabin full of oyster shells. The rick

was then set afire and allowed to collapse into the pit as it burned.

As the rick burned, temperatures of approximately 2000° F were obtained. This level of heat was essential if the necessary chemical reactions required to convert the calcium carbonate in the oyster shells into calcium oxide was to occur. Although information pertaining to the size of ricks used during colonial era is extremely rare, one source<sup>6</sup> suggests that "two or three hundred bushels [of lime]" were being produced per burn.

## *Archeology of Lime Middens*

After thorough examination of the literature, and the pits that remained following a series of experimental lime burns at Fort Frederica on St. Simons Island, Georgia, it was evident that the manufacture of lime in the fashion described above would leave a significant archeological signature. Stratigraphically the pits, or lime middens, that were created during lime burn should contain layers of shell, burned at very high temperatures, mixed with charcoal, ash, and small quantities of decayed lime.

Analyzing the structure of these lime middens may provide answers to important questions regarding the execution of lime manufacture in the southeast during the colonial era. For example, the literature is essentially mute on the subject of rick size. One source suggests that they were as large as a freight car.<sup>7</sup> There are also no direct references to how many times a particular rick location might have been used. Answers to both of these questions would provide significant insight into the scale of lime manufacture in the colonial southeast. Given the apparent inadequacy of historical documents regarding specifics of colonial lime manufacture, the only other source of information is the archeological record.

The main objective of the archeological investigations summarized below was to identify the location of lime burns associated with Nathaniel Greene's Dungeness plantation and assess, to the extent possible, the size and structure of the remaining lime midden(s).

## *Field Methods*

Cumberland Island National Seashore is administered by the National Park Service. As a general rule, the National Park Service seeks to minimize disturbance to important historic sites during the execution of research at any of its parks,

forests, seashores, and monuments. Our field methodology, therefore, had to balance the requirements of the National Park Service with our desire to obtain information about a practice, once common, now all but forgotten.

The solution to this challenge was to utilize a combination of methods that would result in reasonable data recovery and minimize subsurface disturbance to the site. A widely used method of remote sensing was used to isolate areas that might contain lime middens, and then these were tested using a series of small soil cores.

The use of infrared aerial photographs (IAP) is one of the most common forms of remote sensing used in archeology today. The basic premise behind IAP is that buried cultural features will have different thermal properties than the surrounding, undisturbed, soil matrix.<sup>8</sup> It is the thermal properties of the soil that are recorded on IAPs.

A subsurface feature such as a lime midden should be evident on these photos, if not as a discrete feature at least as an anomaly. Vigorous grass growth will often appear bright red on an infrared photograph.<sup>9</sup> Given the utility of lime as a fertilizer, and the presence of residual lime at a rick site, we expected any potential lime midden areas to present a bright red thermal signature on the IAP.

The information provided by infrared photographs alone was insufficient to yield the kind of insights into lime manufacture that we were seeking. Merely identifying an area characterized by vigorous grass growth does not lead to the inescapable conclusion that a lime midden is present at that location. An underground spring, for example, might also contribute to vigorous grass growth. Consequently, additional fieldwork was necessary to "ground truth" the information produced by examination of the IAPs. We planned to address this problem by taking a series of small soil cores systematically placed in any areas the infrared photos suggested might contain a lime midden. Examination of these cores would provide the stratigraphic information necessary to evaluate whether or not a lime midden was present.

### *Results*

Examination of the IAPs of the Dungeness area revealed a large red anomaly within 150 meters of the existing Dungeness ruin. The area occupied by the red anomaly was approximately 13 meters in diameter. All that remained at this point was to examine the stratigraphy of this area and evaluate whether or not it was consistent with a lime midden.

A sampling grid 25 meters on a side was centered on the potential lime midden area. The sampling grid consisted of nine parallel transects laid

out at 2.5 meter intervals. Cores were taken at 2.5 meter intervals along each transect. Each core was 2.54 centimeters in diameter, and ranged in depth from 10 centimeters to approximately 1.2 meters, depending on soil conditions. A total of 99 cores were obtained and analyzed.

In the analysis of these cores a number of variables were examined to help evaluate whether or not a lime midden might be present. Given the fact that lime production involved burning a rick, we expected to find the soil laced with charcoal fragments and ash, which would be indicated by a grayish tone to the soil color. We also expected to find burned shell that was subjected to heat high enough to produce lime putty. The presence of lime putty turned out to be critical. The shell used to make tabby and lime was taken from Native American shell middens. Most of the shell in these middens represented food refuse, which had probably been exposed to high heat in the cooking process. The heat produced by a typical cooking fire is not hot enough to reduce parts of the shell to lime putty. This requires sustained temperatures of 2000° F. Therefore, the presence of lime putty on a shell was viewed as an indicator that the shell had been burned in a rick as opposed to a cooking fire.

A total of nine cores in two adjacent transects produced materials, in the form of shell reduced in part to lime putty, charcoal, and an ashy character to the soil, consistent with those expected in a lime midden. The area encompassed by the nine cores was approximately 12.5 meters long and 4 meters wide.

A number of factors suggest that the area tested by systematic coring corresponds to the former location of a lime rick. First, the content of the cores themselves is consistent with the buried remnants of a burned lime rick. Second, historical records alluded to earlier indicate that lime ricks could be as large as a "freight" car. The area tentatively identified as a lime midden here, closely approximates the size of a freight car. Lastly, the location of the potential lime midden is in close proximity to a shell source, the midden Dungeness was built upon, and the construction site. The advantages of locating a lime rick close to a shell source is obvious. Shell is bulky and heavy, so transporting it in the quantities required for lime production over long distances could have been an onerous task. The cost in man-hours would have been substantially reduced by executing lime burns in close proximity to the shell source and the construction site.

### *Conclusion*

Cumberland Island is a barrier island. As such, sea shell is ubiquitous. However, shell that has been subjected to heat high enough to reduce portions of sea shell to lime putty is very rare.

Therefore, the fact that we recovered shell exhibiting evidence of lime putty formation, in association with ashy deposits containing bits of charcoal, is highly suggestive. We have concluded that the area tested may well have been the location of a rick to manufacture lime for use in the construction of Dungeness and/or ancillary structures such as the Tabby House.

The results obtained in this study are at once informative, and provocative. There is a very strong likelihood that the area we tested corresponds to the former location of a lime rick. The size and content provides some conformation of the historical record regarding the scale of lime production during the late 18th and early 19th century. The results reported here are provocative in the sense that definitive proof that a lime midden has been found must await future research. Knowing, with certainty, that the feature examined here is in fact a lime midden will require more invasive strategies that we had at our disposal. Questions remain, and the door is open to exciting research in the future.

#### Notes

- <sup>1</sup> Lauren B. Sickels-Taves, "Southern Coastal Lime Burning," *CRM*, 19 (1996), p. 23-25.
- <sup>2</sup> Lauren B. Sickels-Taves and Michael S. Sheehan, *The Lost Art of Tabby Redefined: Preserving Oglethorpes Architectural Legacy*, nd.; Lauren B. Sickels-Taves, "Understanding Historic Tabby

Structures: Their History, Preservation, and Repair," *APT Bulletin*, Vol. XXVIII, No. 2-3, p. 22-9.; Lauren B. Sickels-Taves and Michael S. Sheehan, "More With Less: Implications of Tabby Use by Slaves in Coastal Georgia," Paper presented at the 61st annual meeting of the Society for American Archaeology, New Orleans, LA, 1996.

- <sup>3</sup> Henry Myers, *London Magazine* XIV (1745): 395.
- <sup>4</sup> Lauren B. Sickels-Taves, "Southern Coastal Lime Burning," *CRM*, 19 (1996) p. 23-5.
- <sup>5</sup> Ibid.
- <sup>6</sup> Robert G. Mc Pherson, *The Journal of the Earl of Egmont* (Athens, 1962), p. 210.
- <sup>7</sup> Lauren B. Sickels-Taves and Michael S. Sheehan, *The Lost Art of Tabby Redefined: Preserving Oglethorpes Architectural Legacy*, nd.
- <sup>8</sup> Brian M. Fagan, *In the Beginning* (Longman, 1997), pp. 160-61.
- <sup>9</sup> Ibid.

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